



IFWO

RAW SEQUENCE LISTING

DATE: 08/20/2004

PATENT APPLICATION: US/10/665,990A

TIME: 10:38:11

Input Set : A:\PTO.LM.txt

Output Set: N:\CRF4\08202004\J665990A.raw

4 <110> APPLICANT: Apicella, Michael A.
 5 Edwards, Jennifer L.
 7 <120> TITLE OF INVENTION: Vaccine and compositions for the prevention and treatment of
 Neisserial
 8 infections
 10 <130> FILE REFERENCE: 17023-031001
 12 <140> CURRENT APPLICATION NUMBER: US 10/665,990A
 13 <141> CURRENT FILING DATE: 2003-09-19
 15 <150> PRIOR APPLICATION NUMBER: US 10/621,184
 16 <151> PRIOR FILING DATE: 2003-07-15
 18 <150> PRIOR APPLICATION NUMBER: US 10/066,551
 19 <151> PRIOR FILING DATE: 2002-01-31
 21 <150> PRIOR APPLICATION NUMBER: US 60/344,452
 22 <151> PRIOR FILING DATE: 2001-10-23
 24 <150> PRIOR APPLICATION NUMBER: US 60/310,356
 25 <151> PRIOR FILING DATE: 2001-08-06
 27 <150> PRIOR APPLICATION NUMBER: US 60/266,070
 28 <151> PRIOR FILING DATE: 2001-01-31
 30 <160> NUMBER OF SEQ ID NOS: 32
 32 <170> SOFTWARE: FastSEQ for Windows Version 4.0
 35 <210> SEQ ID NO: 1
 36 <211> LENGTH: 2015
 37 <212> TYPE: PRT
 38 <213> ORGANISM: Neisseria gonorrhoeae
 40 <400> SEQUENCE: 1
 41 Met Asn Lys Gly Leu His Arg Ile Ile Phe Ser Lys Lys His Ser Thr
 42 1 5 10 15
 43 Met Val Ala Val Ala Glu Thr Ala Asn Ser Gln Gly Lys Gly Lys Gln
 44 20 25 30
 45 Ala Gly Ser Ser Val Ser Val Ser Leu Lys Thr Ser Gly Asp Leu Cys
 46 35 40 45
 47 Gly Lys Leu Lys Thr Thr Leu Lys Thr Leu Val Cys Ser Leu Val Ser
 48 50 55 60
 49 Leu Ser Met Val Leu Pro Ala His Ala Gln Ile Thr Thr Asp Lys Ser
 50 65 70 75 80
 51 Ala Pro Lys Asn Gln Gln Val Val Ile Leu Lys Thr Asn Thr Gly Ala
 52 85 90 95
 53 Pro Leu Val Asn Ile Gln Thr Pro Asn Gly Arg Gly Leu Ser His Asn
 54 100 105 110
 55 Arg Tyr Thr Gln Phe Asp Val Asp Asn Lys Gly Ala Val Leu Asn Asn
 56 115 120 125
 57 Asp Arg Asn Asn Asn Pro Phe Leu Val Lys Gly Ser Ala Gln Leu Ile
 58 130 135 140
 59 Leu Asn Glu Val Arg Gly Thr Ala Ser Lys Leu Asn Gly Ile Val Thr

(pg. 6)

ENTERED

RAW SEQUENCE LISTING

DATE: 08/20/2004

PATENT APPLICATION: US/10/665,990A

TIME: 10:38:11

Input Set : A:\PTO.LM.txt

Output Set: N:\CRF4\08202004\J665990A.raw

```

60 145          150          155          160
61 Val Gly Gly Gln Lys Ala Asp Val Ile Ile Ala Asn Pro Asn Gly Ile
62          165          170          175
63 Thr Val Asn Gly Gly Phe Lys Asn Val Gly Arg Gly Ile Leu Thr
64          180          185          190
65 Ile Gly Ala Pro Gln Ile Gly Lys Asp Gly Ala Leu Thr Gly Phe Asp
66          195          200          205
67 Val Arg Gln Gly Thr Leu Thr Val Gly Ala Ala Gly Trp Asn Asp Lys
68          210          215          220
69 Gly Gly Ala Asp Tyr Thr Gly Val Leu Ala Arg Ala Val Ala Leu Gln
70 225          230          235          240
71 Gly Lys Leu Gln Gly Lys Asn Leu Ala Val Ser Thr Gly Pro Gln Lys
72          245          250          255
73 Val Asp Tyr Ala Ser Gly Glu Ile Ser Ala Gly Thr Ala Ala Gly Thr
74          260          265          270
75 Lys Pro Thr Ile Ala Leu Asp Thr Ala Ala Leu Gly Gly Met Tyr Ala
76          275          280          285
77 Asp Ser Ile Thr Leu Ile Ala Asn Glu Lys Gly Val Gly Val Lys Asn
78          290          295          300
79 Ala Gly Thr Leu Glu Ala Ala Lys Gln Leu Ile Val Thr Ser Ser Gly
80 305          310          315          320
81 Arg Ile Glu Asn Ser Gly Arg Ile Ala Thr Thr Ala Asp Gly Thr Glu
82          325          330          335
83 Ala Ser Pro Thr Tyr Leu Ser Ile Glu Thr Thr Glu Lys Gly Ala Ala
84          340          345          350
85 Gly Thr Phe Ile Ser Asn Gly Gly Arg Ile Glu Ser Lys Gly Leu Leu
86          355          360          365
87 Val Ile Glu Thr Gly Glu Asp Ile Ser Leu Arg Asn Gly Ala Val Val
88          370          375          380
89 Gln Asn Asn Gly Ser Arg Pro Ala Thr Thr Val Leu Asn Ala Gly His
90 385          390          395          400
91 Asn Leu Val Ile Glu Ser Lys Thr Asn Val Asn Asn Ala Lys Gly Ser
92          405          410          415
93 Ala Asn Leu Ser Ala Gly Gly Arg Thr Thr Ile Asn Asp Ala Thr Ile
94          420          425          430
95 Gln Ala Gly Ser Ser Val Tyr Ser Ser Thr Lys Gly Asp Thr Glu Leu
96          435          440          445
97 Gly Glu Asn Thr Arg Ile Ile Ala Glu Asn Val Thr Val Leu Ser Asn
98          450          455          460
99 Gly Ser Ile Gly Ser Ala Ala Val Ile Glu Ala Lys Asp Thr Ala His
100 465          470          475          480
101 Ile Glu Ser Gly Lys Pro Leu Ser Leu Glu Thr Ser Thr Val Ala Ser
102          485          490          495
103 Asn Ile Arg Leu Asn Asn Gly Asn Ile Lys Gly Gly Lys Gln Leu Ala
104          500          505          510
105 Leu Leu Ala Asp Asp Asn Ile Thr Ala Lys Thr Thr Asn Leu Asn Thr
106          515          520          525
107 Pro Gly Asn Leu Tyr Val His Thr Gly Lys Asp Leu Asn Leu Asn Val
108          530          535          540

```

RAW SEQUENCE LISTING

DATE: 08/20/2004

PATENT APPLICATION: US/10/665,990A

TIME: 10:38:11

Input Set : A:\PTO.LM.txt

Output Set: N:\CRF4\08202004\J665990A.raw

```

109 Asp Lys Asp Leu Ser Ala Ala Ser Ile His Leu Lys Ser Asp Asn Ala
110 545          550          555          560
111 Ala His Ile Thr Gly Thr Ser Lys Thr Leu Thr Ala Ser Lys Asp Met
112          565          570          575
113 Gly Val Glu Ala Gly Leu Leu Asn Val Thr Asn Thr Asn Leu Arg Thr
114          580          585          590
115 Asn Ser Gly Asn Leu His Ile Gln Ala Ala Lys Gly Asn Ile Gln Leu
116          595          600          605
117 Arg Asn Thr Lys Leu Asn Ala Ala Lys Ala Leu Glu Thr Thr Ala Leu
118          610          615          620
119 Gln Gly Asn Ile Val Ser Asp Gly Leu His Ala Val Ser Ala Asp Gly
120 625          630          635          640
121 His Val Ser Leu Leu Ala Asn Gly Asn Ala Asp Phe Thr Gly His Asn
122          645          650          655
123 Thr Leu Thr Ala Lys Ala Asp Val Asn Ala Gly Ser Val Gly Lys Gly
124          660          665          670
125 Arg Leu Lys Ala Asp Asn Thr Asn Ile Thr Ser Ser Ser Gly Asp Ile
126          675          680          685
127 Thr Leu Val Ala Gly Asn Gly Ile Gln Leu Gly Asp Gly Lys Gln Arg
128          690          695          700
129 Asn Ser Ile Asn Gly Lys His Ile Ser Ile Lys Asn Asn Gly Gly Asn
130 705          710          715          720
131 Ala Asp Leu Lys Asn Leu Asn Val His Ala Lys Ser Gly Ala Leu Asn
132          725          730          735
133 Ile His Ser Asp Arg Ala Leu Ser Ile Glu Asn Thr Lys Leu Glu Ser
134          740          745          750
135 Thr His Asn Thr His Leu Asn Ala Gln His Glu Arg Val Thr Leu Asn
136          755          760          765
137 Gln Val Asp Ala Tyr Ala His Arg His Leu Ser Ile Thr Gly Ser Gln
138          770          775          780
139 Ile Trp Gln Asn Asp Lys Leu Pro Ser Ala Asn Lys Leu Val Ala Asn
140 785          790          795          800
141 Gly Val Leu Ala Leu Asn Ala Arg Tyr Ser Gln Ile Ala Asp Asn Thr
142          805          810          815
143 Thr Leu Arg Ala Gly Ala Ile Asn Leu Thr Ala Gly Thr Ala Leu Val
144          820          825          830
145 Lys Arg Gly Asn Ile Asn Trp Ser Thr Val Ser Thr Lys Thr Leu Glu
146          835          840          845
147 Asp Asn Ala Glu Leu Lys Pro Leu Ala Gly Arg Leu Asn Ile Glu Ala
148          850          855          860
149 Gly Ser Gly Thr Leu Thr Ile Glu Pro Ala Asn Arg Ile Ser Ala His
150 865          870          875          880
151 Thr Asp Leu Ser Ile Lys Thr Gly Gly Lys Leu Leu Leu Ser Ala Lys
152          885          890          895
153 Gly Gly Asn Ala Gly Ala Pro Ser Ala Gln Val Ser Ser Leu Glu Ala
154          900          905          910
155 Lys Gly Asn Ile Arg Leu Val Thr Gly Glu Thr Asp Leu Arg Gly Ser
156          915          920          925
157 Lys Ile Thr Ala Gly Lys Asn Leu Val Val Ala Thr Thr Lys Gly Lys

```

RAW SEQUENCE LISTING

DATE: 08/20/2004

PATENT APPLICATION: US/10/665,990A

TIME: 10:38:11

Input Set : A:\PTO.LM.txt

Output Set: N:\CRF4\08202004\J665990A.raw

```

158      930      935      940
159 Leu Asn Ile Glu Ala Val Asn Asn Ser Phe Ser Asn Tyr Phe Pro Thr
160 945      950      955      960
161 Gln Lys Ala Ala Glu Leu Asn Gln Lys Ser Lys Glu Leu Glu Gln Gln
162      965      970      975
163 Ile Ala Gln Leu Lys Lys Ser Ser Pro Lys Ser Lys Leu Ile Pro Thr
164      980      985      990
165 Leu Gln Glu Glu Arg Asp Arg Leu Ala Phe Tyr Ile Gln Ala Ile Asn
166      995      1000      1005
167 Lys Glu Val Lys Gly Lys Lys Pro Lys Gly Lys Glu Tyr Leu Gln Ala
168      1010      1015      1020
169 Lys Leu Ser Ala Gln Asn Ile Asp Leu Ile Ser Ala Gln Gly Ile Glu
170 1025      1030      1035      1040
171 Ile Ser Gly Ser Asp Ile Thr Ala Ser Lys Lys Leu Asn Leu His Ala
172      1045      1050      1055
173 Ala Gly Val Leu Pro Lys Ala Ala Asp Ser Glu Ala Ala Ala Ile Leu
174      1060      1065      1070
175 Ile Asp Gly Ile Thr Asp Gln Tyr Glu Ile Gly Lys Pro Thr Tyr Lys
176      1075      1080      1085
177 Ser His Tyr Asp Lys Ala Ala Leu Asn Lys Pro Ser Arg Leu Thr Gly
178      1090      1095      1100
179 Arg Thr Gly Val Ser Ile His Ala Ala Ala Leu Asp Asp Ala Arg
180 1105      1110      1115      1120
181 Ile Ile Ile Gly Ala Ser Glu Ile Lys Ala Pro Ser Gly Ser Ile Asp
182      1125      1130      1135
183 Ile Lys Ala His Ser Asp Ile Val Leu Glu Ala Gly Gln Asn Asp Ala
184      1140      1145      1150
185 Tyr Thr Phe Leu Lys Thr Lys Gly Lys Ser Gly Lys Ile Ile Arg Lys
186      1155      1160      1165
187 Thr Lys Phe Thr Ser Thr Arg Asp His Leu Ile Met Pro Ala Pro Val
188      1170      1175      1180
189 Glu Leu Thr Ala Asn Gly Ile Thr Leu Gln Ala Gly Gly Asn Ile Glu
190 1185      1190      1195      1200
191 Ala Asn Thr Thr Arg Phe Asn Ala Pro Ala Gly Lys Val Thr Leu Val
192      1205      1210      1215
193 Ala Gly Glu Glu Leu Gln Leu Leu Ala Glu Glu Gly Ile His Lys His
194      1220      1225      1230
195 Glu Leu Asp Val Gln Lys Ser Arg Arg Phe Ile Gly Ile Lys Val Gly
196      1235      1240      1245
197 Lys Ser Asn Tyr Ser Lys Asn Glu Leu Asn Glu Thr Lys Leu Pro Val
198      1250      1255      1260
199 Arg Val Val Ala Gln Thr Ala Ala Thr Arg Ser Gly Trp Asp Thr Val
200 1265      1270      1275      1280
201 Leu Glu Gly Thr Glu Phe Lys Thr Thr Leu Ala Gly Ala Asp Ile Gln
202      1285      1290      1295
203 Ala Gly Val Gly Glu Lys Ala Arg Val Asp Ala Lys Ile Ile Leu Lys
204      1300      1305      1310
205 Gly Ile Val Asn Arg Ile Gln Ser Glu Glu Lys Leu Glu Thr Asn Ser
206      1315      1320      1325

```

RAW SEQUENCE LISTING

DATE: 08/20/2004

PATENT APPLICATION: US/10/665,990A

TIME: 10:38:11

Input Set : A:\PTO.LM.txt

Output Set: N:\CRF4\08202004\J665990A.raw

```

207 Thr Val Trp Gln Lys Gln Ala Gly Arg Gly Ser Thr Ile Glu Thr Leu
208      1330      1335      1340
209 Lys Leu Pro Ser Phe Glu Ser Pro Thr Pro Pro Lys Leu Ser Ala Pro
210 1345      1350      1355      1360
211 Gly Gly Tyr Ile Val Asp Ile Pro Lys Gly Asn Leu Lys Thr Glu Ile
212      1365      1370      1375
213 Glu Lys Leu Ser Lys Gln Pro Glu Tyr Ala Tyr Leu Lys Gln Leu Gln
214      1380      1385      1390
215 Val Ala Lys Asn Ile Asn Trp Asn Gln Val Gln Leu Ala Tyr Asp Arg
216      1395      1400      1405
217 Trp Asp Tyr Lys Gln Glu Gly Leu Thr Glu Ala Gly Ala Ala Ile Ile
218      1410      1415      1420
219 Ala Leu Ala Val Thr Val Val Thr Ser Gly Ala Gly Thr Gly Ala Val
220 1425      1430      1435      1440
221 Leu Gly Leu Asn Gly Ala Ala Ala Ala Thr Asp Ala Ala Phe Ala
222      1445      1450      1455
223 Ser Leu Ala Ser Gln Ala Ser Val Ser Phe Ile Asn Asn Lys Gly Asp
224      1460      1465      1470
225 Val Gly Lys Thr Leu Lys Glu Leu Gly Arg Ser Ser Thr Val Lys Asn
226      1475      1480      1485
227 Leu Val Val Ala Ala Ala Thr Ala Gly Val Ala Asp Lys Ile Gly Ala
228      1490      1495      1500
229 Ser Ala Leu Asn Asn Val Ser Asp Lys Gln Trp Ile Asn Asn Leu Thr
230 1505      1510      1515      1520
231 Val Asn Leu Ala Asn Ala Gly Ser Ala Ala Leu Ile Asn Thr Ala Ile
232      1525      1530      1535
233 Asn Gly Gly Ser Leu Lys Asp Asn Leu Gly Asp Ala Ala Leu Gly Ala
234      1540      1545      1550
235 Ile Val Ser Thr Val His Gly Glu Val Ala Ser Lys Ile Lys Phe Asn
236      1555      1560      1565
237 Leu Ser Glu Asp Tyr Ile Thr His Lys Ile Ala His Ala Ile Ala Gly
238      1570      1575      1580
239 Cys Ala Ala Ala Ala Asn Lys Gly Lys Cys Gln Asp Gly Ala Ile
240 1585      1590      1595      1600
241 Gly Ala Ala Val Gly Glu Ile Val Gly Glu Ala Leu Thr Asn Gly Lys
242      1605      1610      1615
243 Asn Pro Ala Thr Leu Thr Ala Lys Glu Arg Glu Gln Ile Leu Ala Tyr
244      1620      1625      1630
245 Ser Lys Leu Val Ala Gly Thr Val Ser Gly Val Val Gly Gly Asp Val
246      1635      1640      1645
247 Asn Thr Ala Ala Asn Ala Ala Lys Val Ala Ile Glu Asn Asn Leu Leu
248      1650      1655      1660
249 Ser Gln Glu Glu Tyr Ala Leu Arg Glu Lys Leu Ile Lys Lys Ala Lys
250 1665      1670      1675      1680
251 Gly Lys Gly Leu Leu Ser Leu Asp Trp Gly Ser Leu Thr Glu Gln Glu
252      1685      1690      1695
253 Ala Arg Gln Phe Ile Tyr Leu Ile Glu Lys Asp Arg Tyr Ser Asn Gln
254      1700      1705      1710
255 Leu Leu Asp Arg Tyr Gln Lys Asn Pro Ser Ser Leu Asn Asn Gln Glu

```

RAW SEQUENCE LISTING ERROR SUMMARY DATE: 08/20/2004
PATENT APPLICATION: US/10/665,990A TIME: 10:38:12

Input Set : A:\PTO.LM.txt
Output Set: N:\CRF4\08202004\J665990A.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:19; N Pos. 649,714,717,739,748,757,779,797,806,808,811,844,915,951,964

Seq#:19; N Pos. 988

VERIFICATION SUMMARY

DATE: 08/20/2004

PATENT APPLICATION: US/10/665,990A

TIME: 10:38:12

Input Set : A:\PTO.LM.txt

Output Set: N:\CRF4\08202004\J665990A.raw

L:501 M:283 W: Missing Blank Line separator, <400> field identifier
L:1277 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:600
L:1278 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:660
L:1279 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:720
L:1280 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:780
L:1281 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:840
L:1282 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:900
L:1283 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:960